Appendix A

URS Corporation 2002 Geotechnical Drilling And Sampling Program

A.1 FIELD EXPLORATION

Twenty exploratory borings were drilled for this study to depths of 15 to 19 feet to locate and collect samples of the borrow materials at the project sites. The borings were drilled from December 11 to 12, 2002 under the observation of Mr. Asi Ooraikul of our firm. The borings were drilled using a truck-mounted CME-45 drilling rig owned and operated by Taber Consultants Engineers and Geologists of West Sacramento, California.

A.2 SOIL SAMPLING

Sampling Method

Soil samples were obtained at selected depths in the borings by advancing the sampler into the soils at the bottom of the borehole. The Standard Penetration Test (SPT) split-spoon sampler with 2-inch outside diameter and 1.5-inch inside diameter with no liner was used.

The sampler was threaded to fit a cutting shoe on one end and a check-valve connection at the other end. The borehole was advanced using a 4-inch diameter solid stem auger without sampling performed until the potential borrow material was encountered from the cuttings. After the borehole was drilled to the specified depth, the auger was removed, and the sampler was lowered down through the auger-drilled hole to the bottom, seated, and then driven into the soil with a 140-pound hammer falling 30 inches for each blow. The hammer was controlled by a manual cathead-rope system. The number of hammer blows required to advance the sampler each of the three successive 6-inch increments was counted in the field. The number of blows required to advance the sampler the last 12 inches was recorded as the penetration resistance (blows per foot). Depth to groundwater level was measured with measuring tape prior to backfilling the borehole.

After drilling and sampling, the boreholes were backfilled with cuttings. Excess drill cuttings were spread on the surface within the approved 50-foot radius around the borehole.

Sample Handling

Soil recovered from the SPT split-spoon sampler was placed in sealed “Ziploc” bags that were labeled with the sample number, depth, and date of sampling.

A.3 LOGS OF BORINGS

The soil samples and cuttings were examined and classified in the field as the drilling proceeded. The samples were later taken to our geotechnical laboratory in Pleasant Hill, California, for further examination and testing. Preliminary visual soil classifications were made in accordance with the Unified Soil Classification System and confirmed by examination of the samples in the laboratory and by testing. Logs of borings were prepared from the field logs and laboratory test data.

The logs of borings show the soil classifications (according to the Unified Soil Classification System) of materials encountered, locations where soil samples were obtained, type of sampler used, sampling resistance, and the results of the laboratory tests.

Project: DWR Borrow Area Exploration
Project Location: Bacon Island and Webb Tract, California
Project Number: 26814170.01200

Key to Log of Boring

Elevation feet	Depth, feet	SAMPLES: Type	SAMPLES: Number	Sampling Resistance	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
1	2	3	4	5	6	7	8	9	10	11	12

COLUMN DESCRIPTIONS

1 **Elevation:** Elevation in feet referenced to mean sea level (MSL) or site datum.

2 **Depth:** Depth in feet below the ground surface.

3 **Sample Type:** Type of soil sample collected at depth interval shown; sampler symbols are explained below.

4 **Sample Number:** Sample identification number.

5 **Sampling Resistance:** Number of blows required to advance driven sampler 12 inches beyond first 6-inch interval, or distance noted, using a 140-lb hammer with a 30-inch drop.

6 **Recovery:** Percentage of driven or pushed sample length recovered; "NA" indicates data not recorded.

7 **Graphic Log:** Graphic depiction of subsurface material encountered; typical symbols are explained below.

8 **Material Description:** Description of material encountered; may include density/consistency, moisture, color, and grain size.

9 **Water Content:** Water content of soil sample measured in laboratory, expressed as percentage of dry weight of specimen.

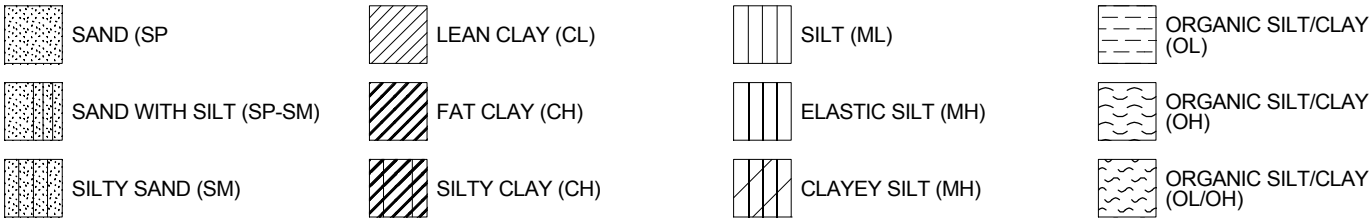
10 **Dry Unit Weight:** Dry weight per unit volume of soil measured in laboratory, expressed in pounds per cubic feet (pcf).

11 **Unconfined Compressive Strength:** Unconfined compressive strength of soil sample measured in laboratory, expressed in psf.

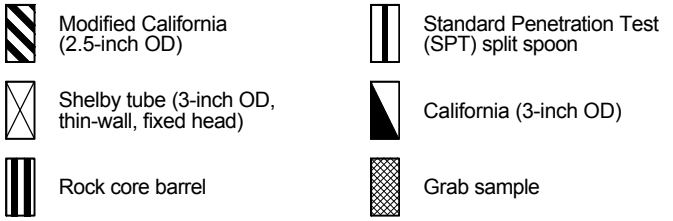
12 **Remarks and Other Tests:** Comments and observations regarding drilling or sampling made by driller or field personnel. Other field and laboratory test results, using the following abbreviations:

LL	Liquid limit (Atterberg Limits test)
PI	Plasticity index (Atterberg Limits test)
SA	Sieve analysis, % < #200 sieve

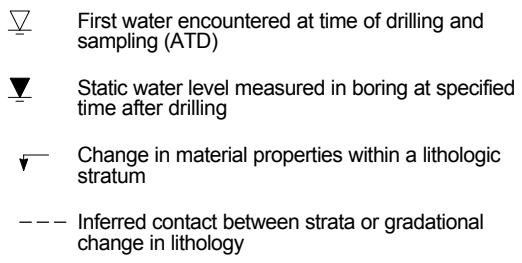
TYPICAL MATERIAL GRAPHIC SYMBOLS



TYPICAL SAMPLER GRAPHIC SYMBOLS



OTHER GRAPHIC SYMBOLS



GENERAL NOTES

1. Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

URS

Figure A-1

Project: DWR Borrow Area Exploration
Project Location: Bacon Island, California
Project Number: 26814170.01200

Log of Boring B-1

Sheet 1 of 1

Date(s) Drilled	**12/11/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**16.5 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**13 feet bgs ATD**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						HIGHLY ORGANIC SOIL (OH) Soft, moist, dark brown, high plasticity, with interbedded peat, trace fine-grained sand				Start at 10:53.
	5										
	10		1-1	4	0		SILTY SAND (SM) Very loose, moist, brown, fine-grained sand				Cuttings from 10 ft retained in bag.
							Increasing clay content				
			1-2	4	89		SANDY SILTY CLAY (CL) Soft to medium stiff, wet, gray, medium plasticity fines, fine-grained sand	40.0			SA: 60%<#200 sieve
	15						Becomes stiff; decreasing sand content				
			1-3	13	89			29.9			LL: 37, PI=22 SA: 74%<#200 sieve
							Bottom of boring at 16.5 feet				End drilling at 11:30.
	20										
	25										
	30										

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 B-01

URS

Figure A-2

Project: DWR Borrow Area Exploration
Project Location: Bacon Island, California
Project Number: 26814170.01200

Log of Boring B-2

Sheet 1 of 1

Date(s) Drilled	**12/11/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**16.5 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**10.5 feet bgs ATD**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						HIGHLY ORGANIC SOIL (OL/OH) Very soft, moist, dark brown, medium to high plasticity, with interbedded peat				Start at 10:35.
	5		2-1	7	44		SILTY SAND (SM) Loose, moist, light brown with orange mottling				
							CLAYEY SILT (MH) Medium stiff, moist, dark gray with orange mottling, high plasticity, trace fine-grained sand Becomes dark brown				
	10						Becomes gray ▽				
							SILTY SAND (SM) Medium dense, wet, gray, fine-grained sand with trace medium grains				
	15		2-2	17	72			23.4			SA: 30%<#200 sieve
							Bottom of boring at 16.5 feet				End drilling at 12:10.
	20										
	25										
	30										

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 B-02

URS

Figure A-3

Project: DWR Borrow Area Exploration
Project Location: Bacon Island, California
Project Number: 26814170.01200

Log of Boring B-3

Sheet 1 of 1

Date(s) Drilled	**12/11/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**16.5 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**9.5 feet bgs ATD**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation feet / Depth, feet	SAMPLES Type / Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
0					HIGHLY ORGANIC SOIL (OH) Very soft, moist, dark brown, high plasticity, with interbedded peat, trace fine-grained sand				Start at 13:15.
5	3-1	8	83		SANDY SILT (ML) Loose, moist, brown, low plasticity fines, fine-grained sand	26.8			SA: 61%<#200 sieve
					SILTY SAND (SM) Very loose, wet, dark gray, fine-grained sand ▽				
10	3-2	3	67			37.7			SA: 47%<#200 sieve
15	3-3	13	67		SAND WITH SILT (SP-SM) Medium dense, wet, gray, fine- to medium-grained sand				
					Bottom of boring at 16.5 feet				End drilling at 13:45.
20									
25									
30									

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 B-03

URS

Figure A-4

Project: DWR Borrow Area Exploration
Project Location: Bacon Island, California
Project Number: 26814170.01200

Log of Boring B-4

Sheet 1 of 1

Date(s) Drilled	**12/11/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**16.5 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**9 feet bgs ATD**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						HIGHLY ORGANIC SOIL (OL/OH) Very soft, moist, black, medium to high plasticity, with interbedded peat				Start at 14:12.
	5										
	10						Becomes dark gray Trace fine-grained sand				
	15		4-1	16	78		SILTY SAND (SM) Medium dense, wet, gray, fine-grained sand with few medium grains	24.1			SA: 30%<#200 sieve
							Bottom of boring at 16.5 feet				End drilling at 14:40.
	20										
	25										
	30										

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 B-04

URS

Figure A-5

Project: DWR Borrow Area Exploration
Project Location: Bacon Island, California
Project Number: 26814170.01200

Log of Boring B-5

Sheet 1 of 1

Date(s) Drilled	**12/11/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**16.5 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**3.5 feet bgs ATD**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						HIGHLY ORGANIC SOIL (OH) Very soft, wet, black, high plasticity, with interbedded peat				Start at 15:05.
	5						CLAYEY SILT (MH) Very soft, wet, brown, high plasticity, trace fine-grained sand				
							SILTY SAND (SM) Medium dense, wet, brown, fine-grained sand				
	10		5-1	26	44		Becomes dark gray				
			5-2	24	100		Becomes gray	19.9			SA: 35%<#200 sieve
	15		5-3	16	56						
							Bottom of boring at 16.5 feet				End drilling at 15:38.
	20										
	25										
	30										

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 B-05

URS

Figure A-6

Project: DWR Borrow Area Exploration
Project Location: Bacon Island, California
Project Number: 26814170.01200

Log of Boring B-6

Sheet 1 of 1

Date(s) Drilled	**12/11/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**16.5 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**3.5 feet bgs ATD**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						HIGHLY ORGANIC SOIL (OH) Very soft, wet, dark brown, high plasticity, with interbedded peat				Start at 15:50.
	5										
	10		6-1	5	67		SILTY SAND (SM) Loose, wet, gray, fine- to medium-grained sand	22.8			SA: 18%<#200 sieve
	15		6-2	10	67						
							Bottom of boring at 16.5 feet				End drilling at 16:22.
	20										
	25										
	30										

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 B-06

URS

Figure A-7

Project: DWR Borrow Area Exploration
Project Location: Bacon Island, California
Project Number: 26814170.01200

Log of Boring B-7

Sheet 1 of 1

Date(s) Drilled	**12/11/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**16.5 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**3 feet bgs ATD**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						HIGHLY ORGANIC SOIL (OH) Very soft, moist, black, high plasticity, with interbedded peat				
	5										
	10						SILTY CLAY (CH) Medium stiff, wet, gray, high plasticity				
	15		7-1	23	67		SILTY SAND (SM) Medium dense, wet, gray, fine-grained sand				
							Bottom of boring at 16.5 feet				
	20										
	25										
	30										

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 B-07

URS

Figure A-8

Project: DWR Borrow Area Exploration
Project Location: Bacon Island, California
Project Number: 26814170.01200

Log of Boring B-8

Sheet 1 of 1

Date(s) Drilled	**12/11/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**16.5 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**11 feet bgs ATD**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						HIGHLY ORGANIC SOIL (OH) Soft, moist, dark brown, high plasticity, with interbedded peat, trace fine-grained sand				Start at 08:18.
	5						ELASTIC SILT (MH) Very soft, moist, gray, high plasticity, trace fine-grained sand				
	10						▽				
	15		8-1	7	67		SILTY SAND (SM) Loose, wet, gray, fine-grained sand				
							Bottom of boring at 16.5 feet				End drilling at 08:44.
	20										
	25										
	30										

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 B-08

URS

Figure A-9

Project: DWR Borrow Area Exploration
Project Location: Bacon Island, California
Project Number: 26814170.01200

Log of Boring B-9

Sheet 1 of 1

Date(s) Drilled	**12/11/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**16.5 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**6 feet bgs ATD**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation, feet	Depth, feet	SAMPLES Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						HIGHLY ORGANIC SOIL (OH) Very soft, moist, dark brown, high plasticity, with interbedded peat				Start at 09:52.
	5						CLAYEY SILT (MH) Soft, wet, gray, high plasticity, trace fine-grained sand ▽				
	10						SANDY SILTY CLAY (CH) Medium stiff, wet, gray, high plasticity fines, fine-grained sand				
			9-1	8	100			38.8			LL=51, PI=29 SA: 54%<#200 sieve
							SILTY SAND (SM) Medium dense, wet, gray, fine-grained sand				
			9-2	13	44			27.7			SA: 30%<#200 sieve
	15		9-3	17	67		←Increase in silt content				
							Bottom of boring at 16.5 feet				End drilling at 10:30. At that time, PG&E notified Asi there is a high pressure gas pipeline in the vicinity of B-8 and B-10, which had already been drilled. Driller had not hit the pipe at either location.
	20										
	25										
	30										

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 B-09

URS

Figure A-10

Project: DWR Borrow Area Exploration
Project Location: Bacon Island, California
Project Number: 26814170.01200

Log of Boring B-10

Sheet 1 of 1

Date(s) Drilled	**12/11/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**16.5 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**9 feet bgs ATD**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						HIGHLY ORGANIC SOIL (OH) Very soft, moist, dark brown, high plasticity, with interbedded peat, trace fine-grained sand				Start at 09:00.
	5						SILTY CLAY (CH) Very soft, moist, gray, high plasticity				
	10						Becomes medium stiff ▽				
	15		10-1	16	67		SILTY SAND (SM) Medium dense, wet, gray, fine-grained sand				
							Bottom of boring at 16.5 feet				End drilling at 09:22.
	20										
	25										
	30										

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 B-10

URS

Figure A-11

Project: DWR Borrow Area Exploration
Project Location: Webb Tract, California
Project Number: 26814170.01200

Log of Boring W-1

Sheet 1 of 1

Date(s) Drilled	**12/12/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**15.0 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**2.5 feet bgs ATD**	Sampling Method(s)	**No sampling performed**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						HIGHLY ORGANIC SOIL (OH) Very soft, moist, dark brown, high plasticity, with interbedded peat, trace fine-grained sand				Start at 14:18.
	5										
	10										
	15						Bottom of boring at 15.0 feet				End drilling at 14:35.
	20										
	25										
	30										

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 W-01

URS

Figure A-12

Project: DWR Borrow Area Exploration
Project Location: Webb Tract, California
Project Number: 26814170.01200

Log of Boring W-2

Sheet 1 of 1

Date(s) Drilled	**12/12/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**16.5 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**2 feet bgs ATD**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						HIGHLY ORGANIC SOIL (OH) Very soft, wet, black, high plasticity, with interbedded peat, trace fine-grained sand				Start at 13:50.
	5										
	10						SILTY SAND (SM) Medium dense, wet, gray, fine-grained sand with few medium grains				
	15		2-1	19	89			22.4			SA: 34%<#200 sieve
							Bottom of boring at 16.5 feet				End drilling at 14:08.
	20										
	25										
	30										

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 W-02

URS

Figure A-13

Project: DWR Borrow Area Exploration
Project Location: Webb Tract, California
Project Number: 26814170.01200

Log of Boring W-3

Sheet 1 of 1

Date(s) Drilled	**12/12/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**19.0 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**2 feet bgs ATD**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						HIGHLY ORGANIC SOIL (OH) Very soft, moist, black, high plasticity, with interbedded peat				Start at 12:35.
	5										
	10						Becomes sandy				
							SILTY SAND (SM) Medium dense, wet, gray, fine-grained sand, low plasticity fines				
	15		3-1	21	67			21.1			LL=22, PI=2 SA: 38%<#200 sieve
			3-2	13	67		SAND WITH SILT (SP-SM) Medium dense, wet, gray, fine- to medium-grained sand	20.1			SA: 11%<#200 sieve
	20						Bottom of boring at 19.0 feet				End drilling at 13:10.
	25										
	30										

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 W-03

URS

Figure A-14

Project: DWR Borrow Area Exploration
Project Location: Webb Tract, California
Project Number: 26814170.01200

Log of Boring W-4

Sheet 1 of 1

Date(s) Drilled	**12/12/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**15.0 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**5 feet bgs ATD**	Sampling Method(s)	**No sampling performed**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						HIGHLY ORGANIC SOIL (OH) Very soft, moist, dark brown, high plasticity, with interbedded peat, some sand				Start at 13:18.
	5						Becomes wet ▽				
	10										
	15						Bottom of boring at 15.0 feet				End drilling at 13:40.
	20										
	25										
	30										

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 W-04

URS

Figure A-15

Project: DWR Borrow Area Exploration
Project Location: Webb Tract, California
Project Number: 26814170.01200

Log of Boring W-5

Sheet 1 of 1

Date(s) Drilled	**12/12/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**16.5 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**9 feet bgs ATD**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						HIGHLY ORGANIC SOIL (OL/OH) Very soft, moist, black, medium to high plasticity, with interbedded peat, trace fine-grained sand				Start at 12:00.
							Becomes sandy				
	5						SILTY SAND (SM) Medium dense, wet, gray, fine- to medium-grained sand				
	10		5-1	12	50			20.6			SA: 12%<#200 sieve
			5-2	10	89						
	15		5-3	5	44		Becomes loose				
							Bottom of boring at 16.5 feet				End drilling at 12:27.
	20										
	25										
	30										

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 W-05

URS

Figure A-16

Project: DWR Borrow Area Exploration
Project Location: Webb Tract, California
Project Number: 26814170.01200

Log of Boring W-6

Sheet 1 of 1

Date(s) Drilled	**12/12/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**16.5 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**7 feet bgs ATD**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						HIGHLY ORGANIC SOIL (OH) Very soft, moist, dark brown, high plasticity, with interbedded peat				Start at 11:17.
	5						Becomes sandy ▽				
	10						SILTY SAND (SM) Loose, wet, gray, fine-grained sand with few medium grains				
			6-1	8	89						
			6-2	5	78			23.1			SA: 32%<#200 sieve
	15		6-3	0	50		Becomes very loose				
							Bottom of boring at 16.5 feet				End drilling at 11:47.
	20										
	25										
	30										

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 W-06

URS

Figure A-17

Project: DWR Borrow Area Exploration
Project Location: Webb Tract, California
Project Number: 26814170.01200

Log of Boring W-7

Sheet 1 of 1

Date(s) Drilled	**12/12/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**16.5 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**4 feet bgs ATD**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						HIGHLY ORGANIC SOIL (OH) Very soft, moist, black, high plasticity, with interbedded peat, trace fine-grained sand				Start at 09:57.
	5										
	10						Becomes sandy				
	15						SAND WITH SILT (SP-SM) Medium dense, wet, gray, fine- to medium-grained sand				
			7-1	17	89			18.3			SA: 9%<#200 sieve
							Bottom of boring at 16.5 feet				End drilling at 10:20.
	20										
	25										
	30										

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 W-07

URS

Figure A-18

Project: DWR Borrow Area Exploration
Project Location: Webb Tract, California
Project Number: 26814170.01200

Log of Boring W-8

Sheet 1 of 1

Date(s) Drilled	**12/12/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**16.5 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**Not encountered**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation feet / Depth, feet	SAMPLES Type / Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
0					SAND WITH SILT (SP-SM) Medium dense, moist, brown, fine-grained sand				Start at 10:37.
5	8-1	18	78			3.0			SA: 7%<#200 sieve
					SAND (SP) Dense, moist, brown, fine-grained with few medium grains, trace silt				
10	8-2	34	89			4.1			SA: 5%<#200 sieve
15	8-3	50	89						
					Bottom of boring at 16.5 feet				End drilling at 11:03.
20									
25									
30									

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 W-08

URS

Figure A-19

Project: DWR Borrow Area Exploration
Project Location: Webb Tract, California
Project Number: 26814170.01200

Log of Boring W-9

Sheet 1 of 1

Date(s) Drilled	**12/12/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**16.5 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**5.5 feet bgs ATD**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						CLAYEY SILT (ML/MH) Soft, moist, brown, medium to high plasticity, trace fine-grained sand				Start at 08:40.
	5						▽				
	10						SANDY HIGHLY ORGANIC SOIL (OH) Very soft, wet, dark brown, high plasticity, with interbedded peat Increasing sand content				
	15		9-1	16	67		SILTY SAND (SM) Medium dense, wet, gray, fine-grained sand				
							Bottom of boring at 16.5 feet				End drilling at 09:05.
	20										
	25										
	30										

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 W-09

URS

Figure A-20

Project: DWR Borrow Area Exploration
Project Location: Webb Tract, California
Project Number: 26814170.01200

Log of Boring W-10

Sheet 1 of 1

Date(s) Drilled	**12/12/02**	Logged By	**A. Ooraikul**	Checked By	**M. Forrest**
Drilling Method	**Solid-Stem Auger**	Drill Bit Size/Type	**4-inch-OD auger bit**	Total Depth of Borehole	**16.5 feet**
Drill Rig Type	**CME 45**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**Not available**
Groundwater Level(s)	**2 feet bgs ATD**	Sampling Method(s)	**SPT split spoon**	Hammer Data	**Safety with rope/cathead; 140 lbs, 30-inch drop**
Borehole Backfill	**Drill cuttings**	Location	**Refer to site plan**		

Elevation feet / Depth, feet	SAMPLES: Type / Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
0					HIGHLY ORGANIC SOIL (OL/OH) Very soft, moist, dark brown, medium to high plasticity, with interbedded peat, trace fine-grained sand				Start at 09:13.
10	10-1	12	78		SILTY SAND (SM) Medium dense, wet, gray, fine-grained sand with few medium grains				
	10-2	9	78		Becomes loose	20.9			SA: 20%<#200 sieve
15	10-3	16	67		Becomes medium dense				
					Bottom of boring at 16.5 feet				End drilling at 09:45.
20									
25									
30									

Report: GEO_10B1_OAK; File: DWRBACON.GPJ; 1/3/2003 W-10

URS

Figure A-21